



Evaluation #

200426-L
(Replaces 200251-L)

Safety & Buildings Division
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*Incomplete Electronic Text,
Contact Department*

Wisconsin Building Products Evaluation

Material

Light-Transmitting Plastics and
Safety-Rated Glazing Panels
Makrolon, Makrolon AR, and Makrolon Hygard

Manufacturer

Sheffield Plastics, Inc.
119 Salisbury Rd.
Sheffield, MA 01257

SCOPE OF EVALUATION

GENERAL: This report evaluates the use of Makrolon® Panels, Makrolon® AR and SL Panels, and Makrolon-Hygard™ CG375, CG500, CG750, BR750, BR1000, and BR1250 Panels, manufactured by Sheffield Plastics, Inc. The panels were evaluated in accordance with the **interior finish** requirements of **IBC Chapter 8**, the **glazing** and **safety glazing** material requirements of **IBC Chapter 24**, and for **light-transmitting plastics**, with respect to flammability, and strength in accordance with the plastic requirements of **IBC Chapter 26**.

The **IBC** requirements below in accordance with the current **Wisconsin Amended ICC Code**:

- **Interior Finish:** Makrolon® (0.06- to 0.500-inch), Makrolon® AR and SL (0.093- to 0.500-inch), Makrolon Hygard™ CG375, CG500, CG750, BR750, BR1000, and BR1250 (0.375-, 0.500-, 0.750-inch, and 1.250-inches), Panels were evaluated for use as an interior finish in accordance with **s. IBC 801.2** and **s. IBC 803.1**. See **Tests And Results** section of this evaluation.
- **Glazing Material:** Makrolon®, Makrolon® AR and SL, and Makrolon Hygard™ Panels were evaluated for use as glazing in accordance with the requirements of **s. IBC 2401.1**.

- **Light-Transmitting Plastic Material:** Makrolon[®] and Makrolon Hygard[™] Panels were evaluated for use as light-transmitting plastic having a CC-1 or CC-2 combustibility rating, a smoke density of less than 75, and a self-ignition greater than 650° F, in accordance with **ss. IBC 2606.1, 2606.2, 2606.3, 2606.4, and s. IBC 2606.5.** See **Tests And Results** section of this evaluation.
- **Safety Glazing Material:** Makrolon[®] (0.06- to 0.500-inch), Makrolon[®] AR (0.093- to 0.500-inch), and Makrolon Hygard[™] Panels CG 375, CG 500, CG 750, BR 750, and BR 1250 (0.375-, 0.500-, 0.750-inch, and 1.250-inches), were evaluated for use as safety glazing in accordance with **s. IBC 2406.1.** See **Tests And Results** section of this evaluation.

DESCRIPTION AND USE

General: Makrolon[®] and Makrolon SL (SunLife) are solid polycarbonate panels used as glazing for window and door assemblies. The panels are available in 4 grades that share the same chemical and physical composition. The differences between the grades are optical quality, and, thickness and size tolerances. The panels are produced from polycarbonate resin pellets which, when melted, are extruded into sheets of the desired thickness, and are available in clear, solar bronze and gray tints. The Makrolon[®] and Makrolon SL panels are available in thickness from 0.06-inch to 0.500-inch and panel sizes are available 24-inches wide by 48-inches long to 96-inches wide by 125-inches long.

Makrolon[®] AR (Abrasion and UV Resistant) panels are the same as **Makrolon[®]** and **Makrolon SL** panels (described above), with a siloxane base coating deposited on the surface. The panels are available in thickness from 0.093- to 0.500-inch. The panel sizes are available in 48-inches wide by 96-inches long to 72-inches wide by 120-inches long.

Makrolon Hygard[®] CG 375, CG 500, CG 750, BR 750, BR 1000 and BR 1250 are laminated panels. All Makrolon Hygard panels, except model BR 750, are composed of Makrolon[®] and Makrolon[®] AR panels with polyurethane inner-layers. Model BR 750 is composed of an acrylic sheet between two Makrolon[®] AR panels. Makrolon Hyzod[®] AR panels are available in thickness, plies and sizes contained in Table I, II and III, and the illustrated figures respectively.

Table I
MAKROLON HYGARD[®] LAMINATES 2-PLY PANEL

Model No.	Thickness (Inches)	Ply Thickness (Inches)		Sheet Size (Inches)	Combustibility Classification
		A	B		
CG-375	.375	.1875	.1875	48 x 60 to 60 x 96	CCI

Table II
MAKROLON HYGARD® LAMINATES 3-PLY PANELS

Model Number	Thickness (Inches)	Ply Thickness (Inches)		Sheet Size (Inches)	Combustibility Classification
		A	B		
CG-500	.500	.125	.250	48x60 to 60x96	CC1
CG-750	.750	.125	.500	48x60 to 60x96	CC1
BR-750	.750	.125	.500	48x60 to 60x96	CC2

Table III
MAKROLON HYGARD® LAMINATES 4-PLY PANELS

Model Number	Thickness (Inches)	Ply Thickness (Inches)		Sheet Size (Inches)	Combustibility Classification
		A	B		
BR-1250	1.250	.125	.500	48x60 to 60x96	CC1
BR-1050	1.000	.125	.375	48x60 to 60x96	CC1

Figures 1, 2, and 3 are for illustration purposes only. They are not intended for use as construction documents for the purpose of fabrication or erection.

TESTS AND RESULTS

Testing in accordance with ASTM E-84 was done on the (*the product name at the time of testing was Poly Glaz, the name has since changed to Makrolon®), Makrolon® polycarbonate sheet and found to have Flame Spread Index of less than 75. **The Smoke Density Factor is unlimited. Per **s. IBC 801.2** and **s. IBC 803.1** of the code, the Makrolon product does meet the interior finish requirements. See **Table IV** below.

Table IV.

Panel Labeled	Exterior Sheet	Interior Sheet	Panel Test ASTM E-84 Flame/Smoke-Developed
*Sheffield Poly Glaz	0.125	None	Flame (Old Method): 90 > 75
Sheffield Makrolon®			Flame (New GWL Method): 50 > 200 **Smoke Density Factor: 725 > 450

Testing in accordance with ASTM D-635, ASTM D-1929 and ASTM D-2843 was done on the product with the current name, Makrolon®. See **Table V** below.

Table V.

Panel Labeled	Thickness	ASTM D-635 Inches Burn Extent	Rating	ASTM D-1929 Flash/Self > 650° F	ASTM D-2843 Smoke Density Rating < 75
Makrolon®	0.060	0.197	CC-1		
Makrolon®	0.500				69.4 %
Makrolon® AR	0.125	0.787	CC-1	800/1030	62.8 %
Makrolon® AR	0.187	0.591	CC-1		
Makrolon® AR	0.250	0.591	CC-1		63.8 %
Makrolon® AR	0.500				64.5 %
Makrolon Hygard® CG	0.375	0.591	CC-1	760/880	66.3 %
Makrolon Hygard® CG	0.500	0.984	CC-1		
Makrolon Hygard® CG	0.750	0.591	CC-1		
Makrolon Hygard® CG	1.250	0.591	CC-1		
Makrolon Hygard® BR	0.750		CC-2	700/840	72.1 %
Makrolon Hygard® BR	1.250		CC-1		74.8 %

☐ Testing of the product as safety glazing in accordance with ANSI Z97.1 sections 4.1 and 4.3 (unlimited), and CPSC 16 CFR, para. 1201 criteria for Category II, was done on the product with the current name, Makrolon® AR Panels (1/8- through 1/2-inch thickness).

☐ Testing of the product as safety glazing in accordance with ANSI Z97.1 sections 4.1 and 4.3, and CPSC 16 CFR, para. 1201 criteria for Category II, was done on the product with the current name, Makrolon® GP (General Purpose) and SL (SunLife) Panels (1/8- and 1/4-inch thickness).

Weathering tests in accordance with ASTM D-1499 were done with samples exposed in an apparatus conforming to ASTM G-23, Type D. Specimens were subjected to Charpy Impact tests before (control) and after weathering in accordance with ASTM D-256, Method B.

LIMITATIONS OF APPROVAL

The **IBC** limitations below are in accordance with the current **Wisconsin Amended ICC**:

1. **Interior Finish:** Makrolon[®] and Makrolon SL Panels, Makrolon[®] AR Panels, and Makrolon Hygard[®] Panels:
 - where used as a plastic veneer shall comply with the requirements of **Chapter 8** in accordance with **s. IBC 2605.1**,
 - where used as light-diffusing systems, the panels shall comply with the requirements of **s. IBC 2606.7**, and
 - used in or as partitions shall comply with the requirements of **Chapter 6 and 8** in accordance with **s. IBC 2606.8**.
2. **Glazing Materials:** Makrolon[®] and Makrolon SL Panels, Makrolon[®] AR Panels, and Makrolon Hygard[®] Panels:
 - where used as a glazing material as defined under the scope of **s. IBC 2401.1**, the glazing material shall be installed in accordance with **s. IBC 2403.2** through **s. IBC 2403.5**, and **s. IBC 2405**.
3. **Light-Transmitting Plastic Material:** Makrolon[®] and Makrolon SL Panels, Makrolon[®] AR Panels, and Makrolon Hygard[®] Panels:
 - where used as a light-transmitting plastic material, the panels meet the requirements of **s. IBC 2606.4**. The panels shall be installed in accordance with **s. IBC 2606.1** through **s. IBC 2611.4**.
4. **Safety Glazing:** Makrolon[®] and Makrolon SL Panels, Makrolon[®] AR Panels, and Makrolon Hygard[®] Panels:
 - where used as safety glazing, the panels meet the requirements of **s. IBC 2406.1** criteria for Category II and shall be installed as allowed by **s. IBC 2406**. ■ See Tests And Results section on page 4.
5. **Structural performance:** of the : Makrolon[®] and Makrolon SL Panels, Makrolon[®] AR Panels, and Makrolon Hygard[®] Panels panels was not part of this evaluation. Structural calculations shall be provided for uses as exterior cladding or guard rails.
6. **Identification:** Makrolon[®] and Makrolon SL Panels, Makrolon[®] AR Panels, and Makrolon Hygard[®] Panels shall be in accordance with:
 - **s. IBC 2403.1** when used as a glazing material,
 - **s. IBC 2406.1.1** when used as safety glazing, and
 - **s. IBC 2606.3** when used as a light-transmitting plastic material. All light-transmitting plastic materials approved for use under this section or **s. COMM 61.60(1)** shall be identified by the trade formula, number or name. The light-transmitting plastic panels shall be labeled as follows:

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200426-L-Makrolon[®] Sheet
 200426-L-Makrolon[®] 9160 (Matte)
 200426-L-Makrolon[®] 9180 (Pebble)
 200426-L-Makrolon[®] SL SunLife Sheet
 200426-L-Makrolon[®] AR Sheet
 200426-L-Makrolon HYGARD[®] CG375 2-Ply Laminate
 200426-L-Makrolon HYGARD[®] CG500 3-Ply Laminate
 200426-L-Makrolon HYGARD[®] CG750 3-Ply Laminate
 200426-L-Makrolon HYGARD[®] BR750 3-Ply Laminate
 200426-L-Makrolon HYGARD[®] BR1250 4-Ply Laminate

7. **Thermal Performance:** Panel U-values were **not** evaluated (when used for the glazing portion of

assemblies). U-value ratings established by testing in accordance with ASTM C-177 and ASTM C-518 shall be submitted on a job-to-job basis to support calculations that show compliance with the IECC as Modified by **Chapter Comm 63**.

This approval will be valid through December 31, 2009, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date:

Approval Date: October 7, 200

By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau